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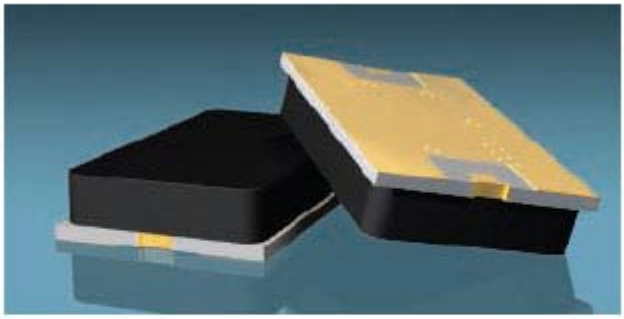
Limiters Provide Protection to 8 GHz

These compact surface-mount diode limiters offer fast-acting protection for receiver front ends against high-level CW and pulsed input signals across single-unit bandwidths as wide as 20 MHz to 8 GHz.

Diode limiters are invaluable for such applications as receiver protection, where having them in the circuit can protect other sensitive components—such as diode-based mixers—from damage due to a sudden high-level pulse. The new LM series of diode limiters from Aeroflex/Metelics makes it easy to add this level of protection to almost any circuit in compact fashion. The LM series of diode limiters are available for applications from L-band at 1 to 2 GHz through C-band at 4 to 8 GHz.

The small size of the lm series diode limiters belies their power handling capabilities. They are produced by means of a hybrid manufacturing process using discrete PIN diodes and passive components on a ceramic substrate. They can handle signal levels of 100 W continuous-wave (CW) power and 2 kW peak (pulsed) power in RoHS-compliant surface-mount packages measuring only 8 x 5 x 2.5 mm.



The LM Series of surface-mount diode limiters are available for high-power receiver protection over frequency ranges as broad as 20 MHz to 8 GHz.

The limiters provide higher thermal capacity and protection than silicon or GaAs monolithic-microwave-integrated-circuit (MMIC) alternatives, and can be specified in low-power models handling as much as 4 W CW, medium-power versions to 30 W CW, and high-power versions to 100 W CW. All models exhibit low flat leakage power and minimal signal-path degradation, with second-harmonic levels of typically -50 dBc. The limiters provide protection while minimizing generation of heat from high-level input signals with a thermal resistance of less than 15°C/W.

At the low end, for example, model LM401102-Q-C-301 operates from 400 to 1000 MHz with typical insertion loss of 0.3 dB and typical insertion loss of 17 dB. It has an input 1-dB compression point of +10 dBm, but can handle peak power levels to +60 dBm when tested with a 1-µs pulse at 0.001-percent duty cycle. It is rated for CW power levels to +50 dBm. The typical flat leakage power is +18 dBm. the diode limiter features extremely fast recovery time of typically 5 ns.

Slightly higher in frequency, model LM501202-M-C-300 covers 0.5 to 2.0 GHz with 0.4-dB typical insertion loss and 20- dB typical return loss. It can handle peak power levels to +53 dBm for a 1-µs pulse at 0.1-percent duty cycle and can block CW power levels as high as +45 dBm. This diode limiter has an input 1-dB compression point of +8 dBm and flat leakage power of +21 dBm. Although much slower in response time than the lower frequency model LM401102-Q-C-301 diode limiter, it is still rated for 500 ns.

The company also offers some extremely broadband models, including the model LM200802-M-A-300 with a bandwidth of typically 20 MHz to 8 GHz. The component incorporates anti-parallel limiter diodes on a ceramic substrate mounted in the lm series surface-mount package to provide a single unit with bandwidth that can cover a wide range of applications. The insertion loss is somewhat higher than the lower-frequency units, at typically 1.4 dB, with return loss of typically 15 dB. The typical 1-dB compression point is +8 dBm.

This broadband diode limiter can handle peak power levels to +50 dBm for 1-µs pulses at a 0.001-percent duty cycle and CW power levels to +43 dBm. The flat leakage power is typically +20 dBm while the recovery time is typically 500 ns. The company also offers a 2-to-8-GHz surface-mount limiter, model LM202802-L-C-300, with 1.1-dB insertion loss and 15-dB return loss and roughly the same high-power ratings. This “narrower-band” limiter has a fast recovery time of 75 ns.

Various limiter configurations are available, with and without DC blocks, which can affect the leakage power levels (lower without DC blocks) and recovery times. The diode limiters can handle as much as +60 dBm peak power from 1 to 2 GHz with recovery times as fast as 5 ns. The RoHS-compliant surface-mount limiters are designed to meet the requirements for a wide range of commercial, military, and industrial environments.

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